

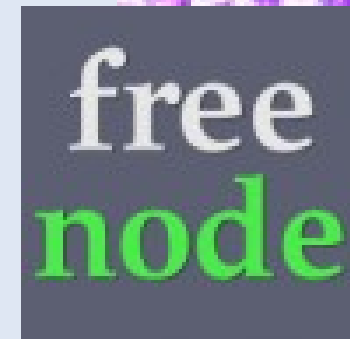
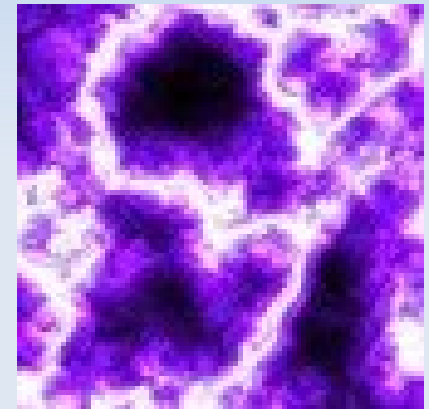
Introduction

References and Presentation at:

<http://www.elinux.org/LCNA-opentools>

Introduction

- Dave Anders aka prpplague



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- Dave Anders aka prpplague
- Currently Contracted with TI



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- Partners in TinCanTools



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- Open Hardware Tools

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- Open Hardware Tools
 - Open Tools History and Background

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 - Open Oscilloscope Solutions

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 - Open Tools History and Background
 - Open Oscilloscope Solutions
 - Open Logic Analyzer Solutions

Open Tools Background

- Open Tools in Science

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 - Experiments often require special tools

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 - New tools are shared with other scientists

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 - Robert Bunsen - Bunsen Burner



Open Tools Background

- Open Tools in Science
- Maker Community



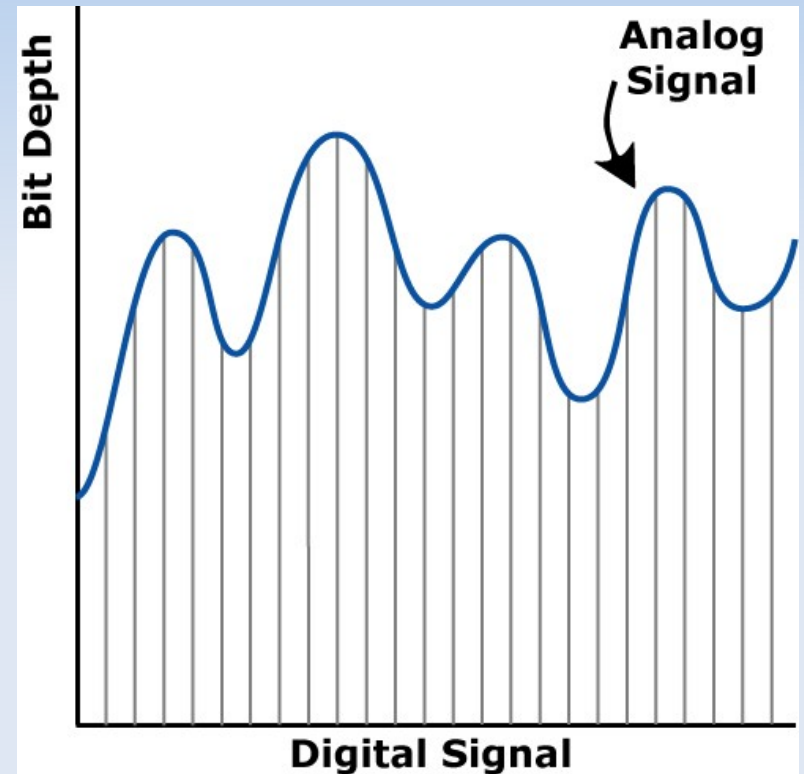
Open Tools Background

- Open Tools in Science
- Maker Community
 - Emphasis on Open



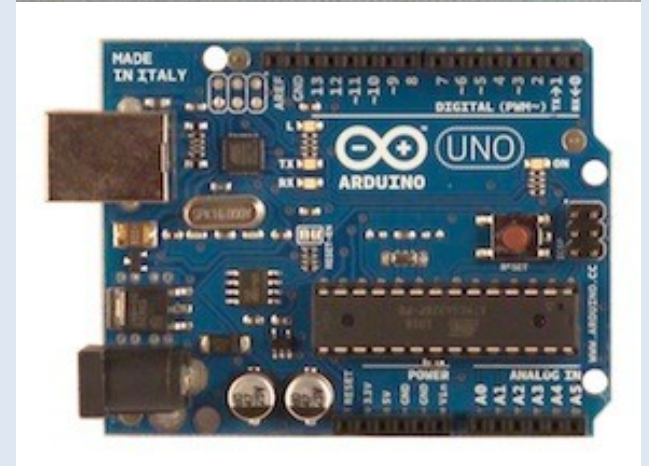
Open Tools Background

- Open Tools in Science
- Maker Community
 - Emphasis on Open
 - Microcontrollers with ADC



Open Tools Background

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 - Atmel AVR (Arduino)



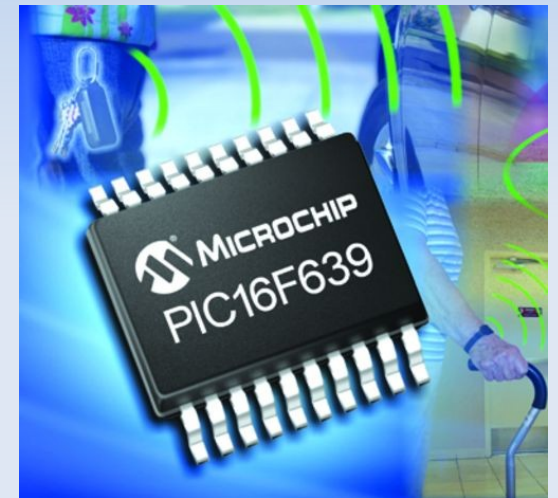
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 - MicroChip PIC



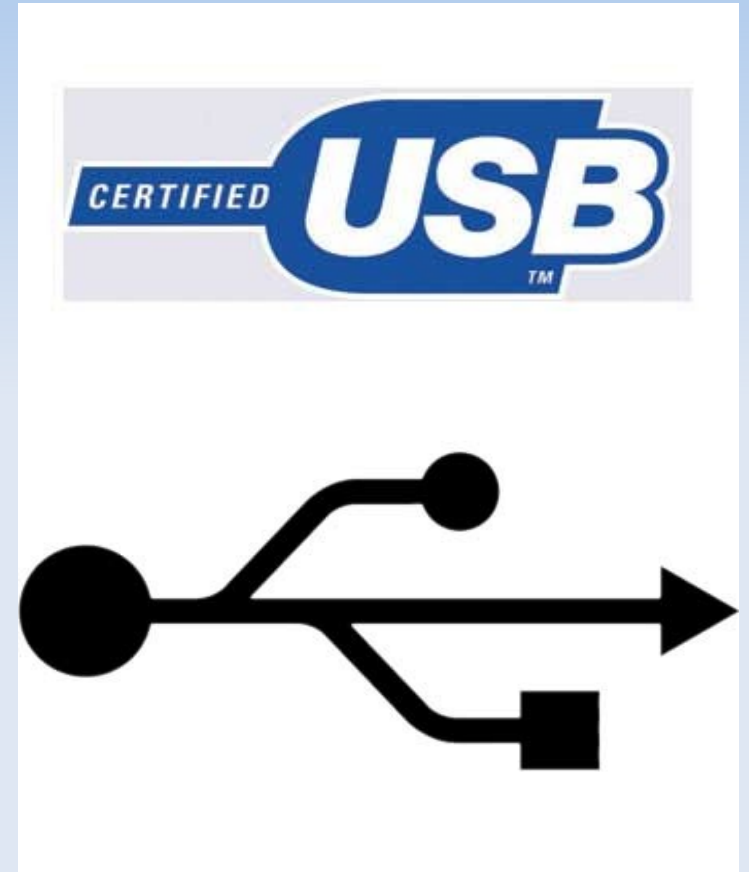
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 - STMicro STM32



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 - USB Bridge Chips



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 - Cypress EZ-USB FX2



Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools

Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
 - Cost



Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
 - Cost
 - Samples Per Second
 - Analog Bandwidth
 - Resolution
 - Number of Channels



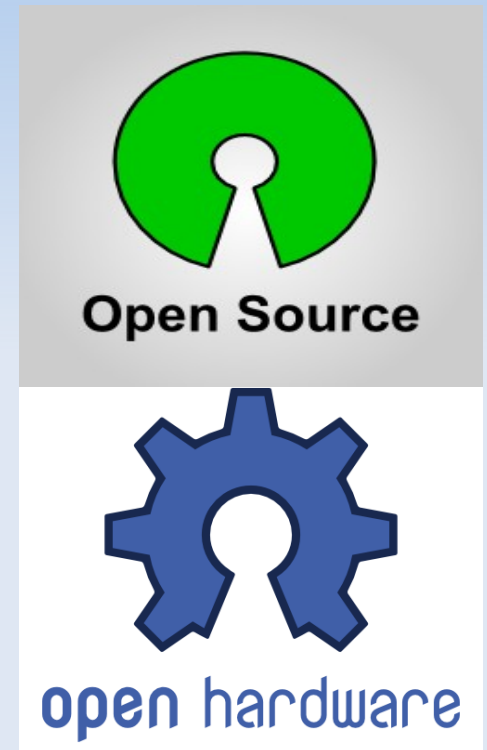
Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
 - Cost
 - Ease of use



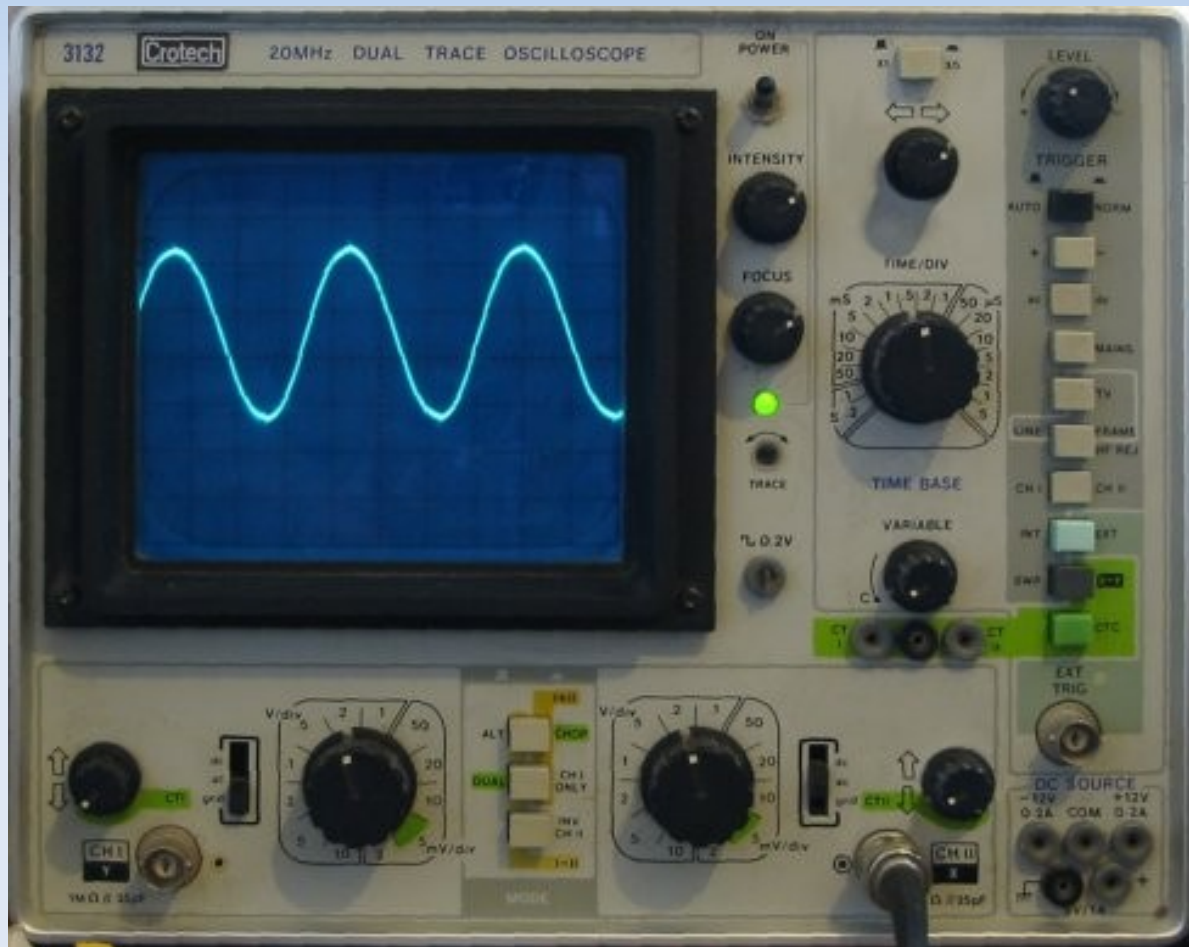
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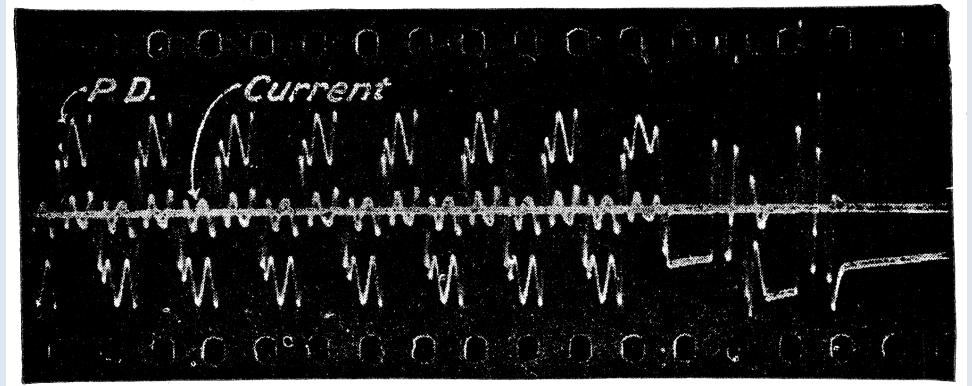
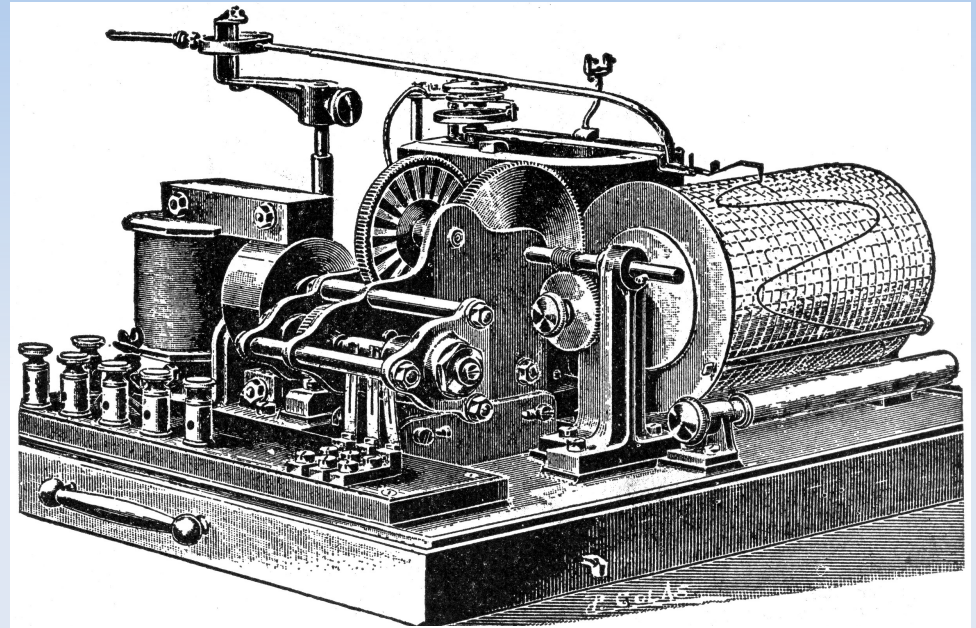
Open Oscilloscope

- The Oscilloscope



Open Oscilloscope

- The Oscilloscope
 - Oscillograph



Open Oscilloscope

- The Oscilloscope
 - Oscillograph
 - CRT Oscilloscope



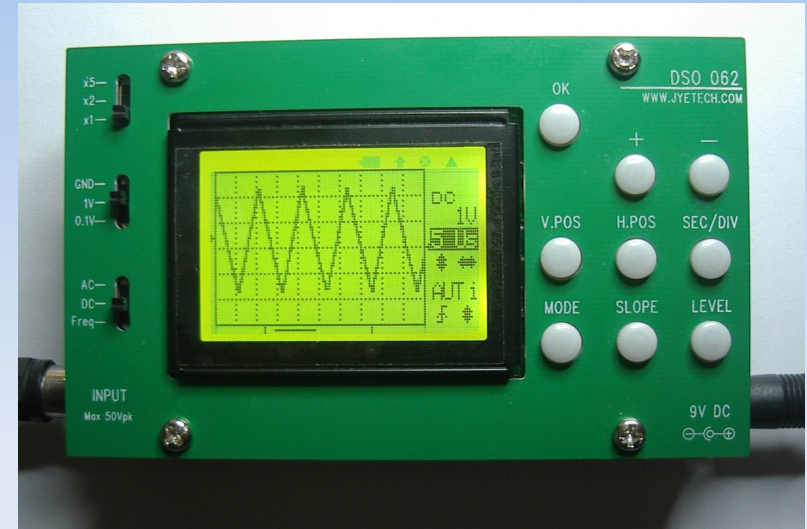
Open Oscilloscope

- The Oscilloscope
 - Oscillograph
 - CRT Oscilloscope
 - Digital Storage Oscilloscope



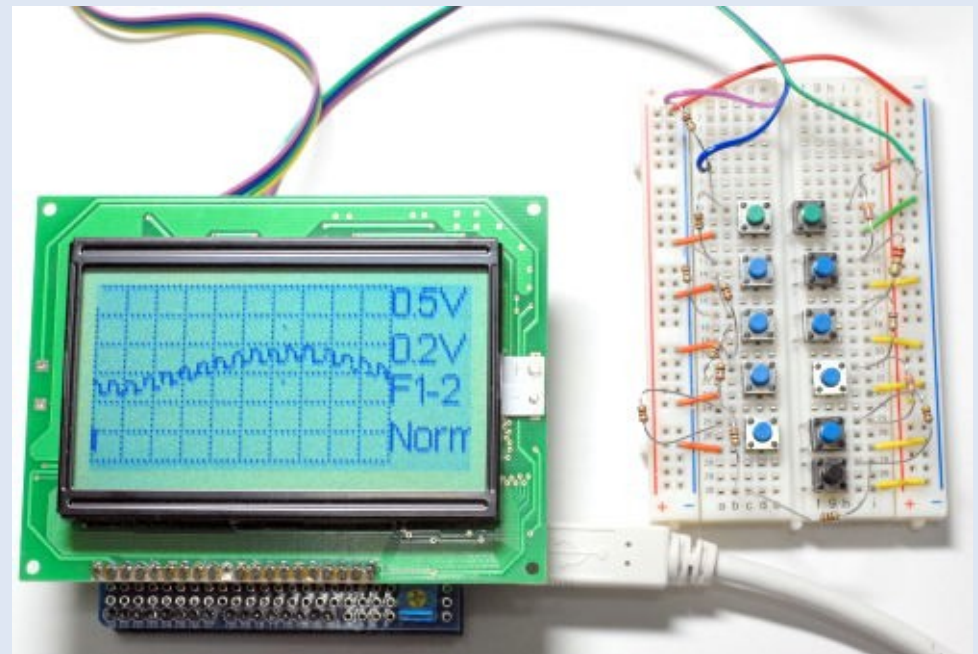
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
 - PIC Based
 - 5M samples/second
 - 8 bit resolution
 - 256 sample memory depth
 - 1MHz analog bandwidth
 - 100mV/Div-5V/Div sensitivity
 - Save and display up to 6 captures to memory
 - Transfer screen capture to PC as a bitmap file (serial adapter not included)
 - \$60.00 from Sparkfun.com



Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
 - PIC Based
 - AVR Based
 - Easy Assembly
 - Under \$30



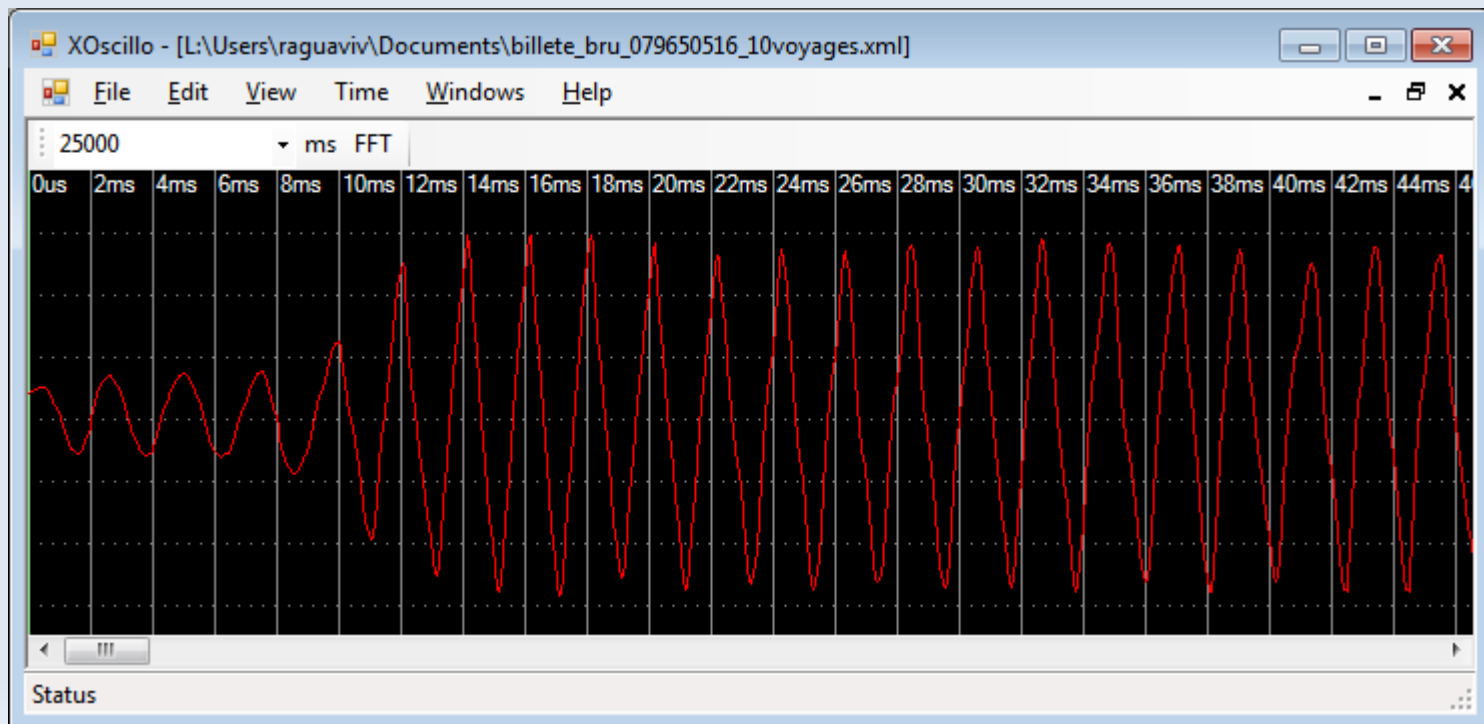
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
 - PIC Based
 - AVR Based
 - STM32 Based – Nano-DSO
 - Color display
 - 6 triggering mode
 - 1MHz Analog Bandwidth
 - Built-in Signal Generator
 - \$99 from Sparkfun.com



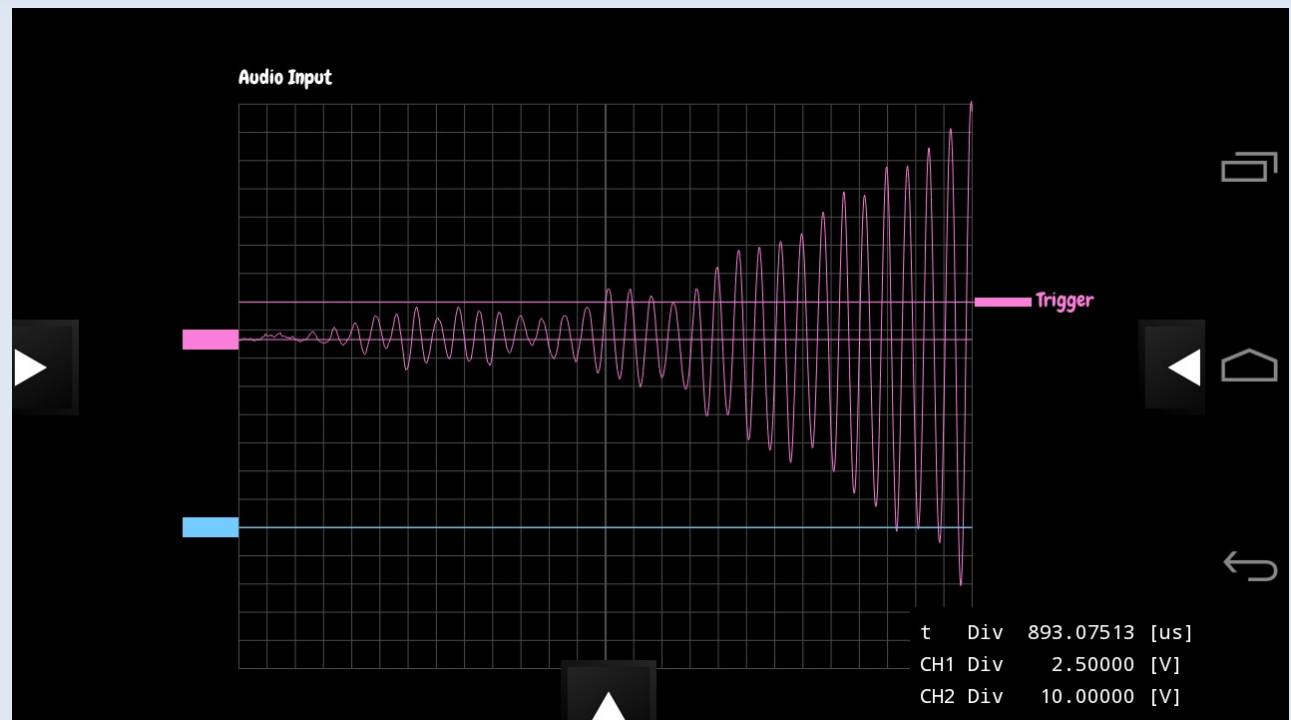
Open Oscilloscope

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- Hardware Solutions
- Software Solutions
 - XOscillo



Open Oscilloscope

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 - OsciPrime



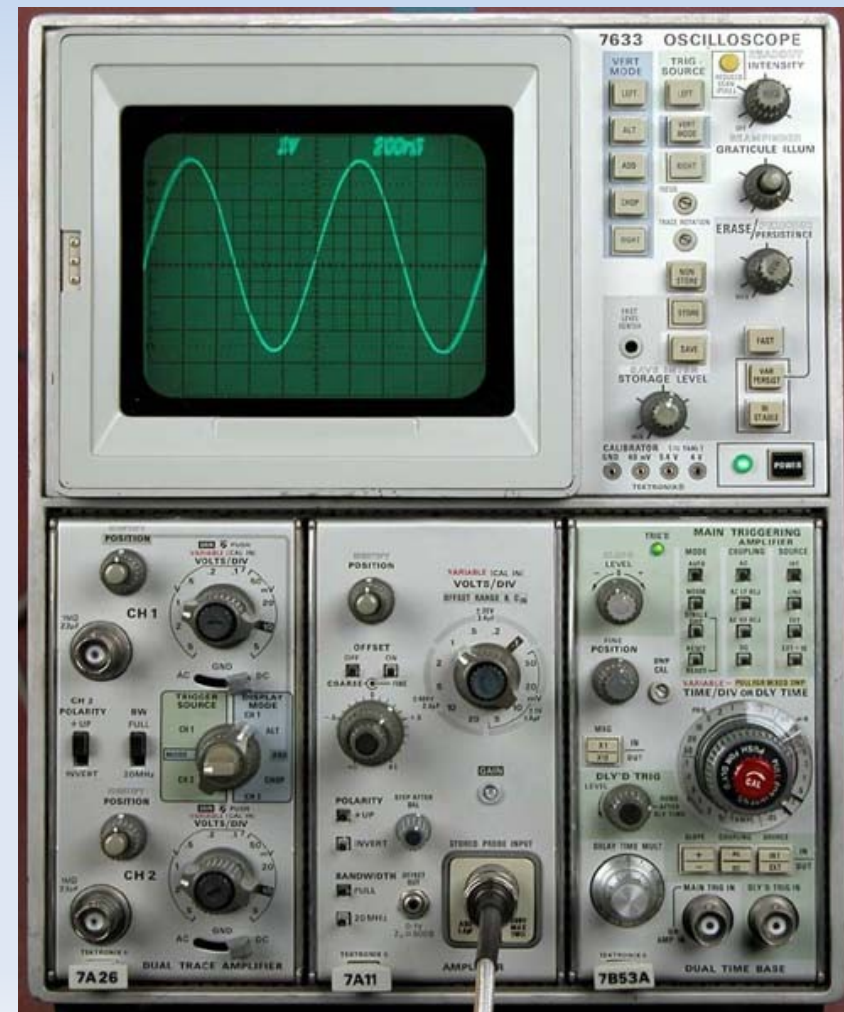
Open Logic Analyzers

- The Logic Analyzer



Open Logic Analyzers

- The Logic Analyzer
 - Originally a variation of Oscilloscope
 - Voltmeters
 - Oscillators
 - Oscilloscopes
 - Spectrum Analyzer



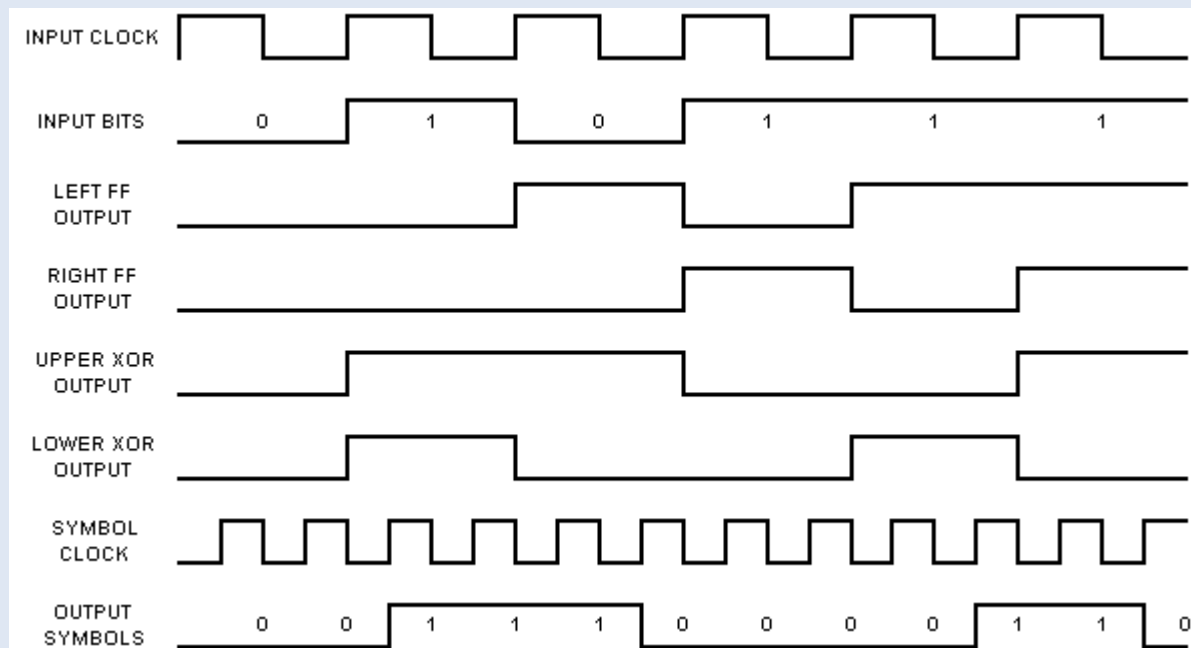
Open Logic Analyzers

- The Logic Analyzer
 - Originally a variation of Oscilloscope
 - HP Created Modern Digital Logic Analyzers



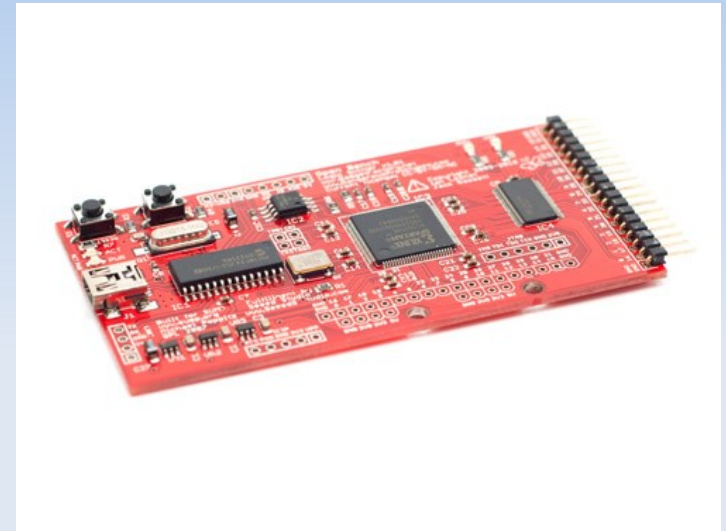
Open Logic Analyzers

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 - Originally a variation of Oscilloscope
 - HP Created Modern Digital Logic Analyzers
 - More Concerned with Timing than Shape



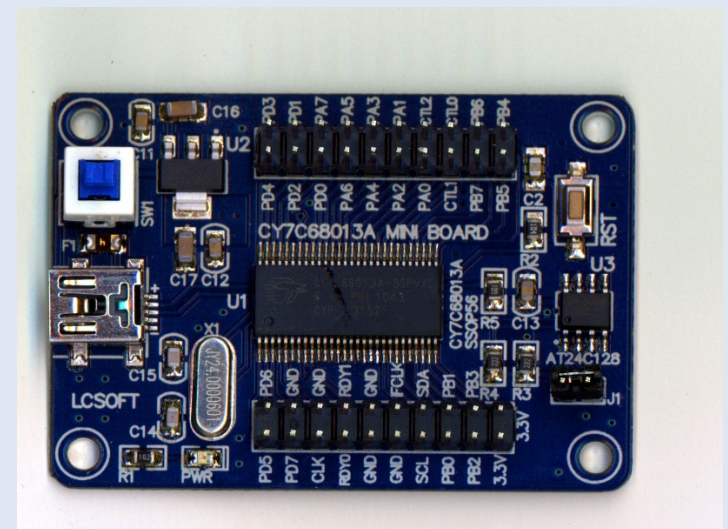
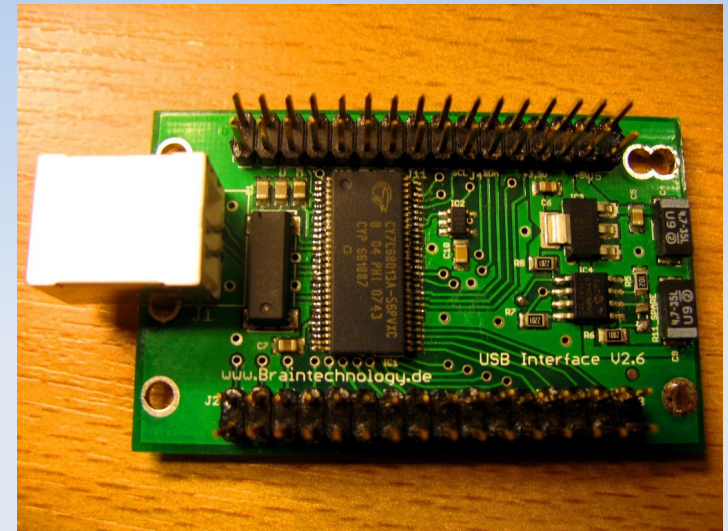
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
 - Open Logic Sniffer
 - 70MHz+ sample speeds
 - 32 channels
 - 16 buffered, 5volt tolerant
 - USB powered
 - USB upgradable everything
 - Make it as DIY as possible
 - \$30-\$40 price range



Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
 - Open Logic Sniffer
 - FX2 Based
 - 16 Channels
 - 24MHz Sample Rate
 - \$20 to \$150



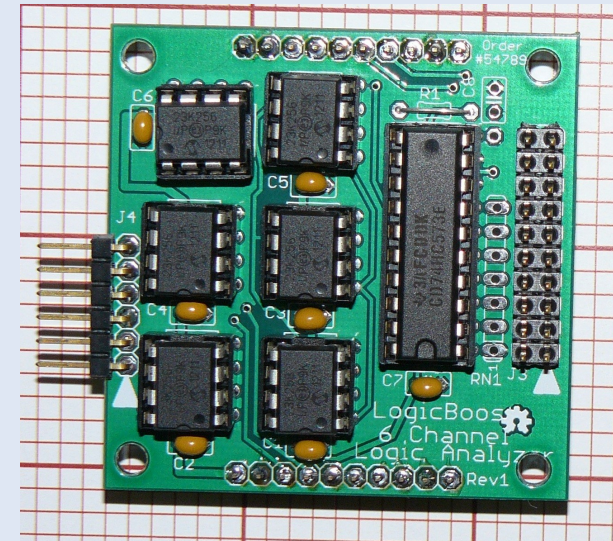
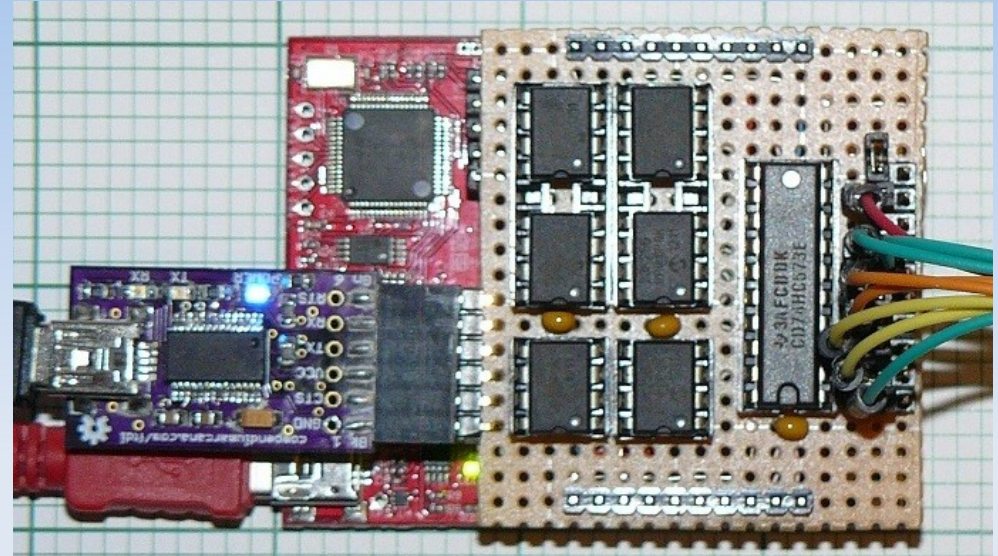
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
 - Open Logic Sniffer
 - FX2 Based
 - Logic Shrimp
 - 4 channels @ 256K samples per channel
 - 20/12/6/3/2/1MHz capture rates, and lower
 - USB connection, USB upgradable
 - \$35.00 from SeeedStudio



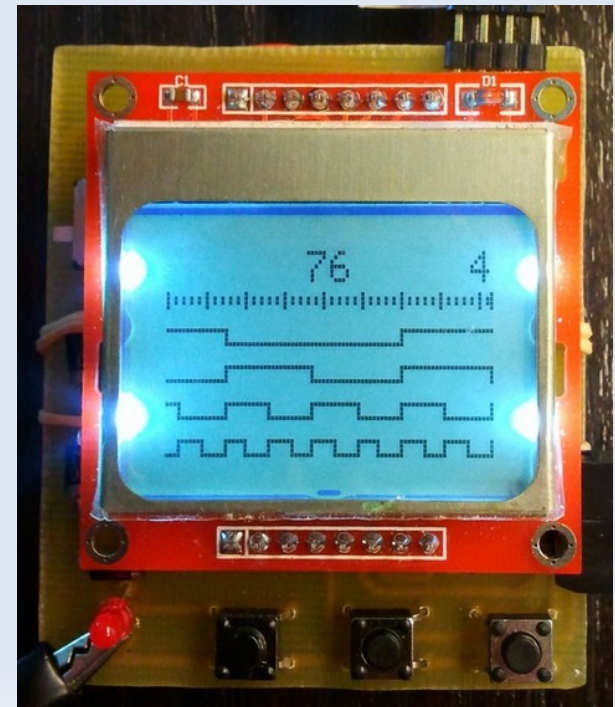
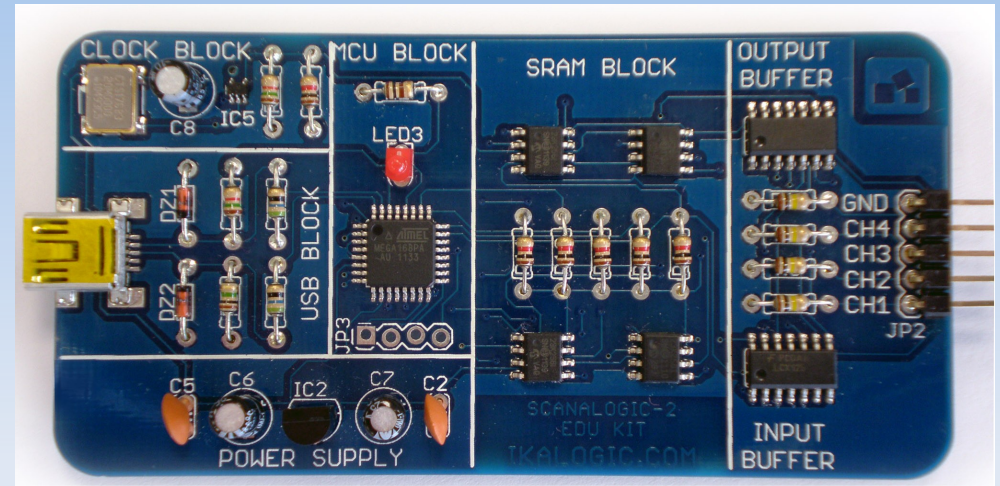
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
 - Open Logic Sniffer
 - FX2 Based
 - Logic Shrimp
 - MSP430 Based
 - \$25 to \$35



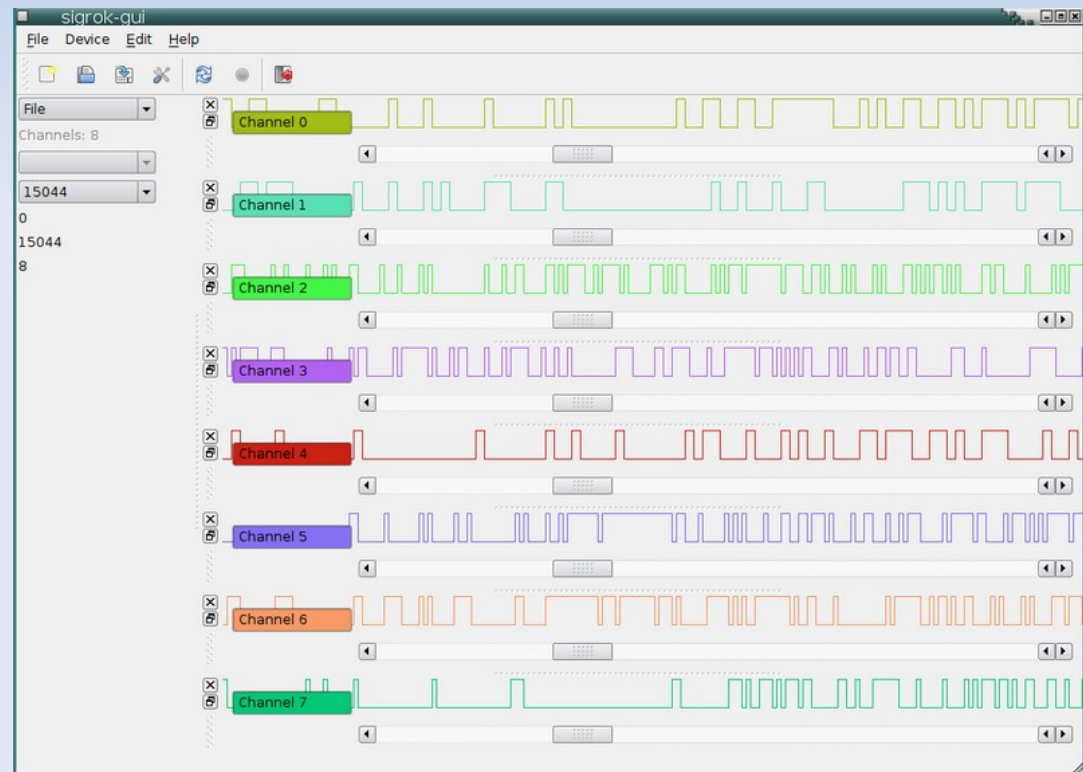
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
 - Open Logic Sniffer
 - FX2 Based
 - Logic Shrimp
 - MSP430 Based
 - AVR Based
 - \$35 to \$50



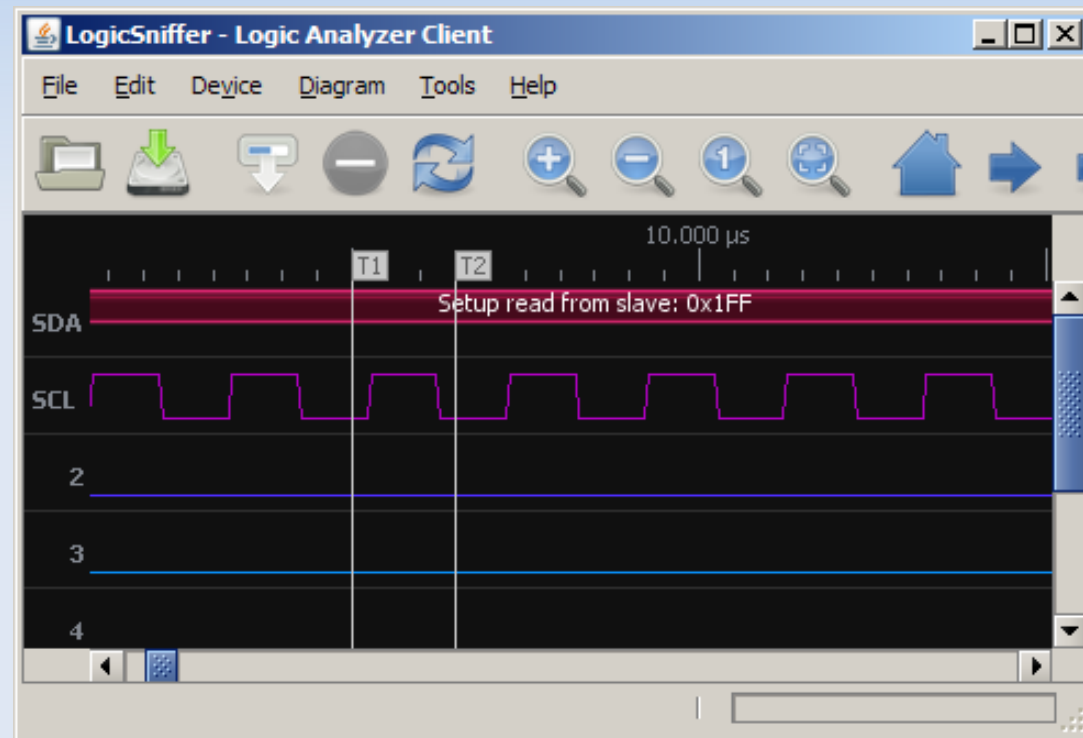
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
- Software Solutions
 - Sigrok



Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
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 - Logic Sniffer



Conclusion

- Long History of Open Tools

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- Low Cost Microcontrollers

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- Documentation

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Questions?